

WE CLAIM:

1. **An Intelligent Object Pool for an information technology platform** and Intelligent Object data architecture, said Intelligent Object Pool comprising processing components, interfaces, and their comprised structures, definitions, algorithms and methods for

- a. bi-directional information interchange between core architectural elements of the platform; including at least one or some combination of an external Intelligent Object Handler; comprised Intelligent Objects; and comprised iPool data subsets; said information interchange enabled by access interfaces interacting with other access interfaces and/or components, as well as various modules and plug-ins; and
- b. bi-directional information interchange between components and access interfaces, such as between a comprised result aggregation engine component, a comprised result aggregation engine interface; an external master query interface, and an external status management component;
 - i. said information interchange taking place in automated; event-driven; interactive; and/or user-directed methods for activation and implementation of comprised methods for
- c. defining and managing Intelligent Object boundaries and access;
- d. processing of result aggregation; and
- e. storage, processing and management of
 - i. Intelligent Objects, said Intelligent Objects comprising such as vectorized pointers to accessible data content; meta-data; and data-enabling methods and processes; as well as of
 - ii. data pool or "Pool" contents, comprising the entity of potentially accessible Intelligent Objects and their data content.

2. An Intelligent Object Pool as in Claim 1, comprising further methods, such as for

- a. provision of automated; event-driven; interactive; and/or user-directed methods for activation and implementation of comprised methods for;
 - i. management and processing of Intelligent Object subsets (iPools);
 - ii. assessment, ranking, alerting and validating data integrity;
 - ii. management and processing of data exchange;

- iii. management and processing of data definition;
- iv. management and processing of process optimization;
- v. processing of queries;
- vi. processing of analyses;
- vii. processing of significance generation;
- viii. provision of data relationship viewing;
- ix. provision of data relationship analysis;
- x. provision of data relationship learning and knowledge extraction; and
- b. storage, processing and management of data subset Intra-Pools (iPools) comprising defined subsets of Intelligent Object data within said data Pool.

3. An Intelligent Object Pool as in Claim 1, comprising further methods for
- a. provision of pool boundary protocols, definitions and methods for data security; data integrity assessment; and data exchange via comprised components and access interfaces;
 - b. provision of meta-data indices and query protocols, definitions and methods for Intelligent Object meta-data definition and annotation; meta-data linking; access optimization, routing optimization and processing optimization via comprised components and interfaces;
 - c. provision of pool content access protocols, definitions and methods for aggregate meta-data definition; provision of meta-data definitions via table lookup for interactive content routing;
 - d. provision of meta-data definitions via table lookup for direct information interchange between Intelligent Objects; aggregation of processing or query results; report generation; and data relationship viewing via comprised sets of components and interfaces.

4. An Intelligent Object Pool as in Claim 1, comprising further pool content access protocols including modules for distributed learning and knowledge extraction; such as distributed learning engines (DLE/DLEi); and/or knowledge extraction engines (KEE/KEEi).

5. **An object pool for an information technology platform** and data object data architecture, said object pool comprising processing components, interfaces, and their comprised structures, definitions, algorithms and methods for

a. bi-directional information interchange between core architectural elements of the platform; including at least one or some combination of an external data object Handler; comprised data objects; and comprised subsets of data objects; said information interchange enabled by comprised modules, plug-ins, access interfaces and/or components;

b. bi-directional information interchange between components and access interfaces, such as between a comprised result aggregation engine component, a comprised result aggregation engine interface; an external master query interface, and an external status management component;

c. provision of automated; event-driven; interactive; and/or user-directed methods for activation and implementation of comprised methods for;

i. management and processing of data object boundaries and access;

ii. processing of result aggregation; and

iii. storage, processing and management of

1. data objects, said data objects comprising such as vectorized pointers to accessible data content; meta-data; and data-enabling methods and processes; as well as of

2. data pool contents, comprising the entity of potentially accessible data objects and their data content.

6. An object pool as in Claim 5, comprising further methods, such as for

a. provision of automated; event-driven; interactive; and/or user-directed methods for activation and implementation of comprised methods for;

i. management and processing of subsets of data objects;

ii. assessment, ranking, alerting and validating data integrity;

iii. management and processing of data exchange;

iv. management and processing of data definition;

v. management and processing of process optimization;

vi. processing of queries;

vii. processing of analyses;

viii. processing of significance generation;

ix. provision of data relationship viewing;

x. provision of data relationship analysis;

- xi. provision of data relationship learning and knowledge extraction;
- b. storage, processing and management of
 - i. data subset Intra-Pools (subsets of data objects) comprising defined subsets of data object data within said data Pool.

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7. An object pool as in Claim 5, comprising further methods for

a. provision of pool boundary protocols, definitions and methods for data security; data integrity assessment; and data exchange via comprised components and access interfaces.

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b. provision of meta-data indices and related meta-data query protocols, definitions and methods for data object meta-data definition and annotation; meta-data linking; access optimization, routing optimization and processing optimization via comprised components and interfaces;

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c. provision of pool content access protocols, definitions and methods for aggregate meta-data definition; provision of meta-data definitions via table lookup for interactive content routing; provision of meta-data definitions via table lookup for direct information interchange between data objects; aggregation of processing or query results; report generation; and data relationship viewing via comprised sets of components and interfaces.

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8. An object pool as in Claim 5, comprising further pool content access protocols including modules for distributed learning and knowledge extraction; such as distributed learning engines (DLE/DLEi); and/or knowledge extraction engines (KEE/KEEi).

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9. A set of pool boundary protocols for provision of data security, exchange and integrity, comprising components and access interfaces providing methods for

a. bi-directional information interchange with components and access interfaces including at least one or some combination of comprised Intelligent Objects, Pool, iPools and an external Intelligent Object Handler;

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b. defining boundaries for access, security and authentication.

10. A set of pool boundary protocol definitions as in Claim 9, comprising components and access interfaces providing further methods for

- a. generation and management of data availability and accessing information;
- b. management and processing of data subscribed to or otherwise exchanged;
- c. maintenance of access histories for auditing of exchange and ownership activities; and
- d. verification of data integrity states for quality assurance.

11. A set of pool boundary protocol definitions as in Claim 9, comprising components and access interfaces providing further methods for utilization of Intelligent Objects.

12. A set of pool boundary protocol definitions as in Claim 9, comprising components and access interfaces providing further methods for utilization of object-oriented data structures other than Intelligent Objects.

13. A set of meta-data index definitions to enable definition and linking of multiple dimensions of data annotation and attributes, to provide analytical functionality and to improve query and analytical efficiency, comprising components and access interfaces providing methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of comprised Intelligent Objects, Pool, iPools and an external Intelligent Object Handler;
- b. providing linking of meta-data index definitions;
- c. providing meta-data index-based optimization of queries and processing.

14. A set of meta-data index definitions and methods as in Claim 13, comprising components and access interfaces providing further methods for

- a. generating meta-data index definitions for sets of data;
- b. provision of meta-data information required for definition, translation and integration of Intelligent Objects;
- c. integration of analytical processes with Intelligent Objects and iPools; and
- d. providing meta-data index-based optimization of Intelligent Object-to-Intelligent Object and iPool-to-iPool intercommunication.

15. A set of meta-data index definitions and methods as in Claim 13, comprising components and access interfaces providing further methods for

- a. utilizing meta-data information to activate methods and algorithms such as nested vector lookup tables; interactive presorting and exclusion algorithms and object clustering algorithms.

16. A set of meta-data index definitions and methods as in Claim 13, comprising components and access interfaces providing further methods for utilization of Intelligent Objects.

17. A set of meta-data index definitions and methods as in Claim 13, comprising components and access interfaces providing further methods for utilization of object-oriented data structures other than Intelligent Objects.

18. A set of pool content access definitions, comprising components and access interfaces which provide a variety of automated and/or user-directed methods for Pool and iPool accessing and processing, such as for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of comprised Intelligent Objects, Pool, iPools and an external Intelligent Object Handler; and
- b. aggregating results of queries and/or analytical processes applied to batches or sets of Intelligent Object data.

19. A set of pool content access definitions and methods as in Claim 18, comprising components and access interfaces providing further methods for

- a. data relationship viewing;
- b. application of custom-defined methods to data sets;
- c. real-time significance detection;
- d. real-time significant answer generation; and
- e. report generation.

20. A set of pool content access definitions and methods as in Claim 18, comprising components and access interfaces providing further methods for

- a. enabling object-to-analysis tools interactions;
- b. provision of result merging algorithms; and
- c. provision of clustering algorithms; including

- i. calculation methods not limited to

- 1. Jacquard coefficient;
 - 2. Dice coefficient;
 - 3. Jeffrey coefficient;
 - 4. Pearson coefficient
 - 5. simple matching;
 - 6. product moment correlation coefficient;
 - 7. mean square difference; and;
 - 8. absolute difference; and

- ii. clustering methods: not limited to

- 1. minimum variance;
 - 2. single, complete, average and weighted average linking;
 - 3. median method;
 - 4. centroid method;
 - 5. neighbor joining method;
 - 6. Fitch-Margoliash least square method; and
 - 7. Fitch-Margoliash evolutionary clock method.

21. A set of pool content access definitions and methods as in Claim 18, comprising components and access interfaces providing further methods for provision of learning and knowledge extraction algorithms.

22. A set of pool content access definitions as in Claim 18, comprising components and access interfaces providing further methods for utilization of Intelligent Objects.

23. A set of pool content access definitions as in Claim 18, comprising components and access interfaces providing further methods for utilization of object-oriented data structures other than Intelligent Objects.

24. An iPool security authentication component (iPSA) for provision and implementation of Intelligent Object, Pool and iPool security definitions, authentication and access permissions, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the unified presentation layer; iPool security authentication interface; and pool boundary protocol components;
- b. definition of access permissions;
- c. implementation of criteria for permission or denial of specific access, routing and processing activities; including at least one or some combination of permission or denial to access and/or route any Intelligent Object data content or property information; and
- d. authentication and permission or denial of data access requests according to correspondence of user login information to user definition and administration permissions provided by such as an external Intelligent Object Handler; iPool access permissions; and Intelligent Object access permissions.

25. An iPool security authentication component as in Claim 24, comprising further methods for

- a. implementation of criteria for permission or denial to access and/or route subsets of data content defined to the level of single bytes by activation of vectorized pointers to said data content.

26. An iPool security authentication component as in Claim 24, comprising further methods for

- a. implementation of criteria for permission or denial to access and/or route subsets iPool meta-data information and definitions; including at least one or some combination of iPool content overviews; and iPool relationship information.

28. An iPool security authentication component as in Claim 24, which comprises further methods for definition and implementation of data according to conditions of ownership.

29. An iPool security authentication component as in Claim 24, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

30. An iPool security authentication interface (iPSAi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the following iPool security authentication component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;
- b. interchange of information required for and/or provided by iPool security authentication; and
- c. provision of iPool security authentication component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

31. An iPool security authentication interface as in Claim 30, comprising further methods for detection and extraction of information required for iPool security authentication.

32. An iPool security authentication interface as in Claim 30, comprising further methods for interchange of information required for and/or provided by iPool security authentication including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

33. An iPool security authentication interface as in Claim 30, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by iPool security authentication.

34. An iPool security authentication interface as in Claim 30, comprised within an information technology platform using Intelligent Objects.

35. An iPool security authentication interface as in Claim 30, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

36. An iPool availability monitoring component (iPAM) for provision and implementation of availability, access and addressing information, comprising automated and/or interactive methods for

- 5 a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; iPool availability monitoring interface; and pool boundary protocol components; and
- b. availability monitoring for iPool data content availability.

10 37. An iPool availability monitoring component (iPAM) as in Claim 36, comprising further methods for

- a. access management for iPool data content according to availability;
- b. generation of meta-data definitions regarding data availability; and
- 15 c. provision of data and data subset cacheing for flagged data including at least one or some combination of specified Intelligent Object data; Intelligent Object data content workspace subsets; offline Intelligent Object data; and for data including at least one or some combination of user defined; often used; and recently used data.

20 38. An iPool availability monitoring component (iPAM) as in Claim 36, comprising further methods for

- a. provision of data content backup functionality for specified data;
- b. provision of multiple content addressing for specified or often used data;
- b. data nomenclature alias detection and linking; and
- 25 c. multiple address ranking and management.

39. An iPool availability monitoring component as in Claim 36, comprised as a module within an information technology platform for Intelligent Objects.

30 40. An iPool availability monitoring component as in Claim 36, comprised as a module within an information technology platform using object-oriented data structures.

41. An iPool availability monitoring interface (iPAMi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

a. bi-directional information interchange with components and access interfaces such as the following iPool availability monitoring component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by iPool availability monitoring; and

c. provision of iPool availability monitoring component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

42. An iPool availability monitoring interface as in Claim 41, comprising further methods for detection and extraction of information required for iPool availability monitoring.

43. An iPool availability monitoring interface as in Claim 41, comprising further methods for interchange of information required for and/or provided by iPool availability monitoring including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

44. An iPool availability monitoring interface as in Claim 41, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by iPool availability monitoring.

45. An iPool availability monitoring interface as in Claim 41, comprised within an information technology platform using Intelligent Objects.

46. An iPool availability monitoring interface as in Claim 41, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

47. An iPool exchange protocol component (iPEP), for data ownership and data exchange definition and management, comprising methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; iPool exchange protocol interface; and pool boundary protocol components;
- b. secure, interactive definition of iPool ownership status; and
- c. definition of iPool ownership privileges and parameters.

48. An iPool exchange protocol component as in Claim 47, comprising further methods for

- a. definition regarding criteria for exchange, including
 - i. protocols and/or algorithms for Intelligent Object data attribute access;
 - ii. protocols and/or algorithms for such as ownership, licensing, and subscriptions;
 - iii. protocols and/or algorithms for such as exchange charges, and royalties;
 - iv. protocols and/or algorithms for exchange accounting; and
 - v. account definitions;
- b. provision of user ownership management;
- c. provision of user ownership recordation;
- d. provision of authentication and permission or denial of iPool access requests; according to correspondence of
 - i. user ownership verification to comprised definitions such as for access, routing and processing;

49. An iPool exchange protocol component as in Claim 47, comprising further methods for

- a. provision of user exchange activity history provided by an interface to an external Intelligent Object Handler;
- b. provision of data attribute access and linking activities;
- c. provision of ownership, licensing, and subscription status;
- d. provision of fees, charges and royalty status information; including
 - i. previewing of fees, charges and/or royalty terms and conditions according to proposed queries and/or user commands defined but not yet requested.

50. An iPool exchange protocol component as in Claim 47, comprised as a module within an information technology platform for Intelligent Objects.

51. An iPool exchange protocol component as in Claim 47, comprised as a module within an information technology platform using object-oriented data structures.

52. **An iPool exchange protocol interface (iPEPi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

a. bi-directional information interchange with components and access interfaces such as the following iPool exchange protocol component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by iPool exchange protocol; and

c. provision of iPool exchange protocol component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

53. An iPool exchange protocol interface as in Claim 52, comprising further methods for detection and extraction of information required for iPool exchange protocol.

54. An iPool exchange protocol interface as in Claim 52, comprising further methods for interchange of information required for and/or provided by iPool exchange protocol including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

55. An iPool exchange protocol interface as in Claim 52, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by iPool exchange protocol.

56. An iPool exchange protocol interface as in Claim 52, comprised within an information technology platform using Intelligent Objects.

57. An iPool exchange protocol interface as in Claim 52, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

5 58. **An object integrity assessment component (OIA) for detection and verification of data integrity**, comprising methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; object integrity assessment interface; and pool boundary protocol components;
- 10 b. provision of data checksums and checksum reporting; and
- c. provision of algorithms for data integrity verification.

59. An object integrity assessment component as in Claim 58, comprising further methods for

- 15 a. review of Intelligent Object state histories for alerts or integrity violations; and
- b. provision of various authentication and integrity verification procedures as required for quality assurance/quality control.

60. An object integrity assessment component as in Claim 58, comprising further methods for

- 20 a. provision of alerts regarding Intelligent Object integrity violation status; and
- b. provision of alerts regarding processes that may or will violate Intelligent Object integrity.

25 61. An object integrity assessment component as in Claim 58, comprising further methods for activation of an interactive user interface providing a description of said alert and providing optional processing methods and/or cancellation of said processes.

30 62. An object integrity assessment component as in Claim 58, comprised as a module within an information technology platform for Intelligent Objects.

63. An object integrity assessment component as in Claim 58, comprised as a module within an information technology platform using object-oriented data structures.

64. **An object integrity assessment interface (iOIAi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the following iPool integrity assessment component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;
- b. interchange of information required for and/or provided by object integrity assessment; and
- c. provision of object integrity assessment component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

65. An object integrity assessment interface as in Claim 64, comprising further methods for detection and extraction of information required for object integrity assessment.

66. An object integrity assessment interface as in Claim 64, comprising further methods for interchange of information required for and/or provided by object integrity assessment including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

67. An object integrity assessment interface as in Claim 64, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by object integrity assessment.

68. An object integrity assessment interface as in Claim 64, comprised within an information technology platform using Intelligent Objects.

69. An object integrity assessment interface as in Claim 64, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

70. An iPool integrity assessment component (iPIA), for detection and verification of iPool integrity, comprising methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; iPool integrity assessment interface; and pool boundary protocol components;
- b. provision of iPool data checksums and checksum reporting; and
- c. provision of algorithms for data set integrity verification.

71. An iPool integrity assessment component as in Claim 70, comprising further methods for

- a. review of iPool histories for alerts or integrity violations; and
- b. provision of various authentication and integrity verification procedures as required for quality assurance/quality control.

72. An iPool integrity assessment component as in Claim 70, comprising further methods for

- a. provision of alerts regarding iPool integrity violation status; and
- b. provision of alerts regarding processes that may or will violate iPool integrity.

73. An iPool integrity assessment component as in Claim 70, comprising further methods for

- a. activation of an interactive user interface providing a description of said alert and providing optional processing methods and/or cancellation of said processes.

74. An iPool integrity assessment component as in Claim 70, comprised as a module within an information technology platform for Intelligent Objects.

75. An iPool integrity assessment component as in Claim 70, comprised as a module within an information technology platform using object-oriented data structures.

76. An iPool integrity assessment interface (iPIAi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the following iPool integrity assessment component; Intelligent Object Pool access

interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by iPool integrity assessment; and

c. provision of iPool integrity assessment component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

77. An iPool integrity assessment interface as in Claim 76, comprising further methods for detection and extraction of information required for iPool integrity assessment.

78. An iPool integrity assessment interface as in Claim 76, comprising further methods for interchange of information required for and/or provided by iPool integrity assessment including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

79. An iPool integrity assessment interface as in Claim 76, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by iPool integrity assessment.

80. An iPool integrity assessment interface as in Claim 76, comprised within an information technology platform using Intelligent Objects.

81. An iPool integrity assessment interface as in Claim 76, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

82. An iPool meta-data index component (iMDX), for generation and provision of iPool meta-data information, comprising methods for

a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; iPool meta-data index interface; and meta-data index components;

i. provision of meta-data definitions for iPool data subsets; such as

1. data subset content attributes;
2. data type, structure, and access dependencies;
3. data ownership and access information; and
4. data relationship information; according to available algorithms for determination of such as, but not limited to similarity; association; contiguity; proximity; dependency; functionality; data activity ranking; data significance ranking; and data validation ranking.

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83. An iPool meta-data index component as in Claim 82, further comprising methods for
- a. exclusion of irrelevant object data layers;
 - b. provision of result aggregation optimization based on linking of result aggregation requirements to iPool Meta-data index content; and
 - c. provision of query optimization based on linking of query parameters to iPool Meta-data index content.

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84. An iPool meta-data index component as in Claim 82, further comprising methods for provision of iPool meta-data information required for methods and processes including at least one or some combination of iPool activation; iPool sorting; iPool-to-iPool queries; iPool data presentation; and result generation.

85. An iPool integrity assessment component as in Claim 82, comprised as a module within an information technology platform for Intelligent Objects.

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86. An iPool integrity assessment component as in Claim xx, comprised as a module within an information technology platform using object-oriented data structures.

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87. An iPool meta-data index interface (iMDXi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for
- a. bi-directional information interchange with components and access interfaces such as the following iPool integrity assessment component; Intelligent Object Pool access

interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by iPool meta-data indexing; and

c. provision of iPool meta-data index component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

88. An iPool meta-data index interface as in Claim 87, comprising further methods for detection and extraction of information required for iPool meta-data indexing.

89. Pool meta-data index interface as in Claim 87, comprising further methods for interchange of information required for and/or provided by iPool meta-data indexing actions including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

90. Pool meta-data index interface as in Claim 87, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by iPool meta-data indexing.

91. Pool meta-data index interface as in Claim 87, comprised within an information technology platform using Intelligent Objects.

92. Pool meta-data index interface as in Claim 87, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

93. A real-time meta-data linking component (RML), for dynamic linking of meta-data, comprising methods for

a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; real-time meta-data linking interface; and meta-data index components;

b. detection of meta-data presented via actions including automated and/or user-directed queries; commands; and processing requests; and

c. linking of meta-data detected corresponding to meta-data comprised within linked meta-data indices.

94. A real-time meta-data linking component as in Claim 93, comprising further methods for linking of meta-data detected corresponding to meta-data comprised within linked meta-data indices said meta-data comprising at least one or some combination of attributes; annotations; properties, values, definitions; tables; lists; addressing protocols; access and routing protocols; processing protocols; and/or query parameters.

95. A real-time meta-data linking component as in Claim 93, comprising further methods for

- a. activation of methods and processes corresponding to linked meta-data;
- b. provision of relevant data access based on correspondence of said query and/or processing request meta-data parameters to provided meta-data indices.

96. A real-time meta-data linking component as in Claim 93, comprised as a module within an information technology platform for Intelligent Objects.

97. A real-time meta-data linking component as in Claim 93, comprised as a module within an information technology platform using object-oriented data structures.

98. **A real-time meta-data linking interface (RMLi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the following real-time meta-data linking component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

- b. interchange of information required for and/or provided by real-time meta-data linking; and

- c. provision of real-time meta-data linking component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

99. A real-time meta-data linking interface as in Claim 98, comprising further methods for detection and extraction of information required for real-time meta-data linking.

100. A real-time meta-data linking interface as in Claim 98, comprising further methods for interchange of information required for and/or provided by real-time meta-data linking including meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

101. A real-time meta-data linking interface as in Claim 98, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by real-time meta-data linking.

102. A real-time meta-data linking interface as in Claim 98, comprised within an information technology platform using Intelligent Objects.

103. A real-time meta-data linking interface as in Claim 98, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

104. **An Intelligent Object-to-Intelligent Object query component (OQM) for meta-data definition of data interrelationships on the individual data object level**, comprising methods for

a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; Intelligent Object-to-Intelligent Object query interface; and meta-data index components;

b. provision of dynamically updated and/or user-defined meta-data definitions for meta-data linking and query optimization; of at least one or some combination of

i. Intelligent Object state information; structure; function; type; and content; further comprising

ii. meta-data information such as content addressing; content association; weighting; sorting; and ranking; of such as attributes; annotations; and definitions.

105. An Intelligent Object-to-Intelligent Object query component as in Claim 104, comprising further methods for

- a. provision of definitions for Intelligent Object-to-Intelligent Object information interchange; comprising meta-data definitions; lists; tables; indices; for
- b. activation of direct meta-data to meta-data information linking; accessing; routing; and information interchange corresponding to automated and/or user-directed queries.

106. An Intelligent Object-to-Intelligent Object query component as in Claim 104, comprising further methods for

- a. organization of said Intelligent Object content and meta-data linking according to information including at least one or some combination of content attributes; validation state; ranking; relationships; associations; and the like for
- b. provision of query optimization; based on dynamic updating of said Intelligent Object organization and linking for information interchange; according to correspondence between said information and queries; query histories; commands; command histories; and/or other access, routing and processing actions.

107. An Intelligent Object-to-Intelligent Object query in Claim 104, comprised as a module within an information technology platform for Intelligent Objects.

108. An Intelligent Object-to-Intelligent Object query component as in Claim 104, comprised as a module within an information technology platform using object-oriented data structures.

109. An Intelligent Object-to-Intelligent Object meta-data query interface (OQMi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the following Intelligent Object-to-Intelligent Object query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

- b. interchange of information required for and/or provided by Intelligent Object-to-Intelligent Object meta-data query optimization; and
- c. provision of Intelligent Object-to-Intelligent Object meta-data query component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

110. An Intelligent Object-to-Intelligent Object meta-data query interface as in Claim 109, comprising further methods for detection and extraction of information required for customization and/or optimization of Intelligent Object-to-Intelligent Object queries.

111. An Intelligent Object-to-Intelligent Object meta-data query interface as in Claim 109, comprising further methods for interchange of information required for and/or provided by Intelligent Object-to-Intelligent Object query processes, said information comprising meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

112. An Intelligent Object-to-Intelligent Object query interface as in Claim 109, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by Intelligent Object-to-Intelligent Object meta-data queries.

113. An Intelligent Object-to-Intelligent Object query interface as in Claim 109, comprised within an information technology platform using Intelligent Objects.

114. An Intelligent Object-to-Intelligent Object query interface as in Claim 109, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

115. An iPool-to-iPool query component (PPQ) for meta-data definition of data interrelationships on the iPool level, comprising methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; iPool-to-iPool query interface; and meta-data index components;

- b. provision of dynamically updated and/or user-defined meta-data definitions for meta-data linking and query optimization; of at least one or some combination of
- i. Intelligent Object state information; structure; function; type; and content; further comprising
 - ii. meta-data information such as content addressing; content association; weighting; sorting; and ranking; of such as attributes; annotations; and definitions.

116. An iPool-to-iPool query component as in Claim 115, comprising further methods for

- a. provision of definitions for iPool-to-iPool information interchange; comprising meta-data definitions; lists; tables; indices; for
- b. activation of direct meta-data to meta-data information linking; accessing; routing; and information interchange corresponding to automated and/or user-directed queries.

117. An iPool-to-iPool query component as in Claim 115, comprising further methods for

- organization of said iPool content and meta-data linking according to information including at least one or some combination of content attributes; validation state; ranking; relationships; associations; and the like for
- provision of query optimization; based on dynamic updating of said iPool organization and linking for information interchange; according to correspondence between said information and queries; query histories; commands; command histories; and/or other access, routing and processing actions.

118. An iPool-to-iPool query in Claim 115, comprised as a module within an information technology platform for Intelligent Objects.

119. An iPool-to-iPool query component as in Claim 115, comprised as a module within an information technology platform using object-oriented data structures.

120. An **iPool-to-iPool meta-data query interface (OQMi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

a. bi-directional information interchange with components and access interfaces such as the following iPool-to-iPool query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by iPool-to-iPool meta-data query optimization; and

c. provision of iPool-to-iPool meta-data query component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

121. An iPool-to-iPool meta-data query interface as in Claim 120, comprising further methods for detection and extraction of information required for customization and/or optimization of iPool-to-iPool queries.

122. An iPool-to-iPool meta-data query interface as in Claim 120, comprising further methods for interchange of information required for and/or provided by iPool-to-iPool query processes, said information comprising meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

123. An iPool-to-iPool query interface as in Claim 120, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by iPool-to-iPool meta-data queries.

124. An iPool-to-iPool query interface as in Claim 120, comprised within an information technology platform using Intelligent Objects.

125. An iPool-to-iPool query interface as in Claim 120, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

126. An aggregate meta-data index generator component (aMDX), for generating meta-data indices based upon aggregated information and processing results, comprising methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; aggregate meta-data index generator interface; and pool content access components; and
- 5 b. generation of meta-data definitions for iPool data subsets; including at least one or some combination of automatically provided and/or user-defined information regarding Intelligent Object and iPool data.

127. An aggregate meta-data index generator as in Claim 126, comprising further methods for

- 10 a. generation of meta-data definitions for iPool data subsets; including at least one or some combination of automatically provided and/or user-defined information regarding Intelligent Object and iPool data
 - 15 i. including meta-data for such as iPool subset attributes; annotations; protocols; ontologies; content attributes; data type, structure, and access dependencies; ownership and access information; relationship information; activity ranking histories; significance ranking histories; and validation ranking histories.

128. An aggregate meta-data index generator as in Claim 126, comprising further methods for

- 20 a. organization; sorting and ranking of said information according to available algorithms for assessment of relationships such as at least one of the following similarity; association; contiguity; proximity; dependency; functionality; for
- b. query optimization requirements, based on correspondence of submitted query parameters; and query histories; to contents of meta-data indices.

129. An aggregate meta-data index generator as in Claim 126, comprising further methods for

- a. generation of meta-data information required for methods and processes including at least one or some combination of iPool activation; iPool sorting; iPool-to-iPool queries; iPool data presentation; and result generation.

130. An aggregate meta-data index generator as in Claim 126, comprised as a module within an information technology platform for Intelligent Objects.

131. An aggregate meta-data index generator as in Claim 126, comprised as a module within an information technology platform using object-oriented data structures.

132. **An aggregate meta-data index generator interface (aMDXi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

a. bi-directional information interchange with components and access interfaces such as the following iPool-to-iPool query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by comprised methods and processes for meta-data index generation and optimization; and

c. provision of aggregate meta-data index generator component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

133. An aggregate meta-data index generator interface as in Claim 132, comprising further methods for detection and extraction of information required for customization and/or optimization of meta-data index generation.

134. An aggregate meta-data index generator interface as in Claim 132, comprising further methods for interchange of information required for and/or provided by meta-data index generation, said information comprising meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

135. An aggregate meta-data index generator interface as in Claim 132, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by meta-data index generation methods and processes.

136. An aggregate meta-data index generator interface as in Claim 132, comprised within an information technology platform using Intelligent Objects.

137. An aggregate meta-data index generator interface as in Claim 132, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

5 138. **An aggregate real-time significance generator component (aRSG), for comparison; correlation; significance detection; and significance generation** of relationships between Intelligent Object data and between iPool subsets, comprising methods for

10 a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; aggregate real-time significance generator interface; and pool content access components; and

15 b. application of algorithms for normalized comparison; correlation; significance detection and generation of information including at least one or some combination of Intelligent Object properties; data content properties and values; and meta-data index content; according to all valid query parameters.

20 139. An aggregate real-time significance generator as in Claim 138, comprising further methods for organization of data utilizing methods and processes including assembly; ranking; classification; and/or tabulation of Intelligent Objects; based on the significance of results generated by external applications; components; access interfaces; and activated by query submissions, user preference rules and/or viewing instructions.

25 140. An aggregate real-time significance generator as in Claim 138, comprising further methods for

30 a. comparison of normalized parameters such as data content values; and meta-data index properties provided by direct Intelligent Object-to-Intelligent Object; and iPool-to-iPool information interchange provided via addressing including at least one or some combination of vector subset pointing; meta-data index addressing; and activated by such as query submissions, user preference rules and/or viewing instructions; for

b. organization of Intelligent Object and iPools, utilizing methods and processes including assembly; ranking; classification; and/or tabulation of Intelligent Objects.

141. An aggregate real-time significance generator as in Claim 138, comprised as a module within an information technology platform for Intelligent Objects.

142. An aggregate real-time significance generator as in Claim 138, comprised as a module within an information technology platform using object-oriented data structures.

143. **An aggregate real-time significance generator interface (aRSGi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

a. bi-directional information interchange with components and access interfaces such as the following iPool-to-iPool query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by comprised methods and processes for significance generation and optimization; and

c. provision of real-time significance generator component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

144. An aggregate real-time significance generator interface as in Claim 143, comprising further methods for detection and extraction of information required for customization and/or optimization of processes for significance detection and generation.

145. An aggregate real-time significance generator interface as in Claim 143, comprising further methods for interchange of information required for and/or provided by significance generation, said information comprising nested vector lookup tables and meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

146. An aggregate real-time significance generator interface as in Claim 143, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by meta-data index generation methods and processes.

147. An aggregate real-time significance generator interface as in Claim 143, comprised within an information technology platform using Intelligent Objects.

148. An aggregate real-time significance generator interface as in Claim 143, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

149. **A result aggregation engine component (RAE), for aggregation of significant results of queries or analytical processing applied to any content of the Intelligent Object Pool, comprising methods for**

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; result aggregation engine interface; and pool content access components; and
- b. aggregation of significant results provided by an aggregate significance generator module and/or other application, module, component and access interface according to requests for result aggregation submitted via automated; and/or user-directed queries; commands; processing requests; alerts; updates; and reports.

150. A result aggregation engine component as in Claim 149, further comprising methods for

- a. generation of aggregated, customized, assembled, ranked, validated, and/or otherwise classified meta-data profiles; and
- b. generation of aggregated, customized, assembled, ranked, validated, and/or otherwise classified meta-data outputs and updates such as for iPool definition updates; iPool relationship definitions; Intelligent Object definition updates; and Intelligent Object relationship definitions pertaining to Intelligent Object and iPool properties, values and relationships

151. A result aggregation engine component as in Claim 149, further comprising methods for generation of aggregated and otherwise organized results for presentation and reporting via an external Intelligent Object Handler.

152. A result aggregation engine component as in Claim 149, comprised as a module within an information technology platform for Intelligent Objects.

153. A result aggregation engine component as in Claim 149, comprised as a module within an information technology platform using object-oriented data structures.

5 154. A result aggregation engine interface (aRAEi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

10 a. bi-directional information interchange with components and access interfaces such as the following iPool-to-iPool query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by comprised methods and processes for result aggregation and optimization; and

15 c. provision of real-time result aggregation activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

20 155. A result aggregation engine interface as in Claim 154, comprising further methods for detection and extraction of information required for customization and/or optimization of processes for result detection and aggregation.

25 156. A result aggregation engine interface as in Claim 154, comprising further methods for interchange of information required for and/or provided by result aggregation, said information comprising nested vector lookup tables and meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

30 157. A result aggregation engine interface as in Claim 154, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by result aggregation methods and processes.

158. A result aggregation engine interface as in Claim 154, comprised within an information technology platform using Intelligent Objects.

159. A result aggregation engine interface as in Claim 154, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

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160. An IMO Zoom component (IMO-Z) for interactive user viewing, comprising methods for

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- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; IMO Zoom interface; and pool content access components;
- b. accessing and routing of graphical viewing information for user viewing and interactivity.

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161. An IMO Zoom component as in Claim 160, further comprising methods for

- a. extraction of graphical viewing information;
- b. processing of graphical viewing information; and
- c. addressing of graphical viewing information;
 - i. said graphical viewing information comprising at least one or some combination of thumbnail views, expanded or “zoomed” views, data relationship overviews; self-organizing maps; similarity clustering; dendrograms; charts; tables; and/or additional graphical representations.

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162. An IMO Zoom component as in Claim 160, further comprising methods for

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- a. activation of thumbnail viewing of such as Intelligent Object data content; iPool data contents; according to correspondence of meta-data or data content attributes to automated and/or user-directed queries and/or commands.

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163. An IMO Zoom component as in Claim 160, further comprising methods for

- a. provision of user-directed and/or automated graphical pre-sorting and sorting of such as said Intelligent Objects according to correspondence of data content attributes to automated and/or user-directed queries and/or commands.

164. An IMO Zoom component as in Claim 160, comprised as a module within an information technology platform for Intelligent Objects.

165. An IMO Zoom component as in Claim 160, comprised as a module within an information technology platform using object-oriented data structures.

166. An IMO Zoom interface (IMO-Zi) providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following IMO Zoom component; Intelligent Object Pool access interfaces; Intelligent Object Handler; and Intelligent Molecular Objects;
- b. detection of graphical content provided by said Intelligent Objects and their data content; Intelligent Object Pool; iPools; components; and access interfaces;
- c. accessing and routing of graphic information via such as vectorized data field pointers; and meta-data index definitions and linking provided by IMO Zoom viewing processes; and
- d. provision of access control for information interchange to and from said Intelligent Objects, Intelligent Object Pool, iPools, components and interfaces.

167. An IMO Zoom interface as in Claim 166, further comprising automated and/or interactive methods for

- a. synchronization of said viewing information interchange and activity
- b. recordation of said viewing information interchange and activity;
- c. auditing of said viewing information interchange and activity;
- d. validation of said viewing information interchange and activity.

168. An IMO Zoom interface as in Claim 166, comprised within an information technology platform using Intelligent Objects.

169. An IMO Zoom interface as in Claim 166, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

170. A distributed learning engine component (DLE), for automated and/or interactive computer learning in a distributed data and applications environment, comprising methods for

5 a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; distributed learning engine interface; and pool content access components.

b. application of automated and/or interactive learning processes including at least one or some combination of

10 i. simulation; prediction, hypothesis generation, testing, result assessment and comparison; interactive result optimization and feedback;

ii. data and user workspace definition; assessment; organization; customization;

15 iii. data and user workspace relationship definition; assessment; organization; customization; and/or

iv. optimization of accessing, routing and processing protocols for user workspaces; Intelligent Objects; Intelligent Object Pools; and iPools.

20 171. A distributed learning engine component as in Claim 170, comprising further methods for interactive application of protocols, functions and algorithms for learning utilizing including at least one or some combination of user queries; automated queries; customized sets of queries; data objects such as the Intelligent Object; data handlers such as the Intelligent Object Handler; data pools such as the Intelligent Object Pool; iPools; the global data entity; and/or data subsets therein as a data resource.

25 172. A distributed learning engine component as in Claim 170, comprising further methods for

30 a. application of a comprised set of pool content access definitions, which may include but are not limited to the following cross-reference clustering; Boolean network algorithms; Bayesian network algorithms; neural network algorithms; iterative learning algorithms; time series analysis algorithms; pattern matching algorithms; structure matching algorithms; and rule induction algorithms; to enable

b. at least one or more of the following automated, dynamic and/or interactive processes for iterative refinement; significance detection; tabulation; validation; ranking; assembly; and/or other forms of distributed learning.

5 173. A distributed learning engine component as in Claim 170, comprising further methods for provision of said learning processes within a local environment, such as on a single computer containing meaningfully related data and analytical applications.

10 174. A distributed learning engine component as in Claim 170, comprised as a module within an information technology platform for Intelligent Objects.

175. A distributed learning engine component as in Claim 170, comprised as a module within an information technology platform using object-oriented data structures.

15 176. **A distributed learning engine interface (DLEi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

20 a. bi-directional information interchange with components and access interfaces such as the following iPool-to-iPool query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;

b. interchange of information required for and/or provided by comprised methods and processes for distributed learning and optimization; and

25 c. provision of real-time distributed learning component activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

30 177. A distributed learning engine interface as in Claim 176, comprising further methods for detection and extraction of information required for customization and/or optimization of processes for distributed learning.

178. A distributed learning engine interface as in Claim 176, comprising further methods for interchange of information required for and/or provided by distributed learning, said information

comprising nested data content vector lookup tables and meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

5 179. A distributed learning engine interface as in Claim 176, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by distributed learning methods and processes.

10 180. A distributed learning engine interface as in Claim 176, comprised within an information technology platform using Intelligent Objects.

15 181. A distributed learning engine interface as in Claim 176, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

20 182. A **knowledge extraction engine component (KEE), for automated and/or interactive knowledge extraction**, comprising methods for

a. bi-directional information interchange with components and access interfaces including at least one or some combination of the following unified presentation layer; knowledge extraction engine interface; and pool content access components;

b. application of automated and/or interactive knowledge extraction processes including at least one or some combination of

i. active data attribute searching, detection and extraction;

ii. similarity and significance assessment and comparison;

iii. hypothesis generation;

iv. report generation;

v. interactive result optimization and feedback;

vi. data, annotation and user workspace definition; assessment; organization and customization; and

vii. data, annotation and user workspace relationship definition; assessment; organization; and customization.

183. A knowledge extraction engine component as in Claim 182, further comprising methods for

- a. application of a comprised set of pool content access definitions, which may include but are not limited to the following cross-reference clustering; Boolean network algorithms; Bayesian network algorithms; neural network algorithms; iterative learning algorithms; time series analysis algorithms; pattern matching algorithms; structure matching algorithms; and rule induction algorithms; to enable
- b. at least one or more of the following automated, dynamic and/or interactive processes for iterative refinement; significance detection; tabulation; validation; ranking; assembly; and/or other forms of knowledge extraction.

184. A knowledge extraction engine component as in Claim 182, further comprising methods for interactive application of protocols, functions and algorithms for knowledge extraction utilizing including at least one or some combination of user queries; automated queries; customized sets of queries; data objects such as the Intelligent Object; data handlers such as the Intelligent Object Handler; data pools such as the Intelligent Object Pool; iPools; the global data entity; and/or data subsets therein as a data resource.

185. A knowledge extraction engine component as in Claim 182, comprised as a module within an information technology platform for Intelligent Objects.

186. A knowledge extraction engine component as in Claim 182, comprised as a module within an information technology platform using object-oriented data structures.

187. **A knowledge extraction engine interface (KEEi)** providing conventions used to enable communication between components and optionally other interfaces, comprising automated and/or interactive methods for

- a. bi-directional information interchange with components and access interfaces such as the following iPool-to-iPool query component; Intelligent Object Pool access interfaces; data Pool; iPools; Intelligent Object Handler; and Intelligent Molecular Objects;
- b. interchange of information required for and/or provided by comprised methods and processes for knowledge extraction and optimization; and

c. provision of real-time knowledge extraction activity information to access interfaces and components as required for synchronization, recordation, auditing and validation of said information interchange and activity.

5 188. A knowledge extraction engine interface as in Claim 187, comprising further methods for detection and extraction of information required for customization and/or optimization of processes for knowledge extraction.

10 189. A knowledge extraction engine interface as in Claim 187, comprising further methods for interchange of information required for and/or provided by knowledge extraction, said information comprising nested data content vector lookup tables and meta-data index information such as data content information; data attribute information; data relationship information; protocols; ontologies; annotations; and other data-enabling information.

15 190. A knowledge extraction engine interface as in Claim 187, comprising further methods for bi-directional interchange of data content accessed via vector pointers as required for and/or provided by knowledge extraction methods and processes.

20 191. A knowledge extraction engine interface as in Claim 187, comprised within an information technology platform using Intelligent Objects.

25 192. A knowledge extraction engine interface as in Claim 187, further comprised within an information technology platform using object-oriented data structures other than Intelligent Objects.

30 193. A system comprising
1. an object pool for an information technology platform and data object data architecture;
2. a set of pool boundary protocols for provision of data security, exchange and integrity;
3. a set of meta-data index definitions to enable definition and linking of multiple dimensions of data annotation and attributes defined and implemented at levels of individual Intelligent Objects as well as data set or subset iPools;

4. a set of pool content access definitions, comprising components and access interfaces which provide methods for Pool and iPool accessing and processing;
5. an iPool security authentication component (iPSA) for provision and implementation of Intelligent Object, Pool and iPool security definitions, authentication and access permissions;
6. an iPool security authentication interface (iPSAi) providing conventions used to enable communication between components and optionally other interfaces;
7. an iPool availability monitoring component (iPAM) for provision and implementation of availability, access and addressing information;
8. an iPool availability monitoring interface (iPAMi) providing conventions used to enable communication between components and optionally other interfaces;
9. an iPool exchange protocol component (iPEP), for data ownership and data exchange definition and management;
10. an iPool exchange protocol interface (iPEPi) providing conventions used to enable communication between components and optionally other interfaces;
11. an object integrity assessment component (OIA) for detection and verification of data integrity;
12. an object integrity assessment interface (iOIAi) providing conventions used to enable communication between components and optionally other interfaces;
13. an iPool integrity assessment component (iPIA), for detection and verification of iPool integrity;
14. an iPool integrity assessment interface (iPIAi) providing conventions used to enable communication between components and optionally other interfaces;
15. an iPool meta-data index component (iMDX), for generation and provision of iPool meta-data information;
16. an iPool meta-data index interface (iMDXi) providing conventions used to enable communication between components and optionally other interfaces;
17. a real-time meta-data linking component (RML), for dynamic linking of meta-data;
18. a real-time meta-data linking interface (RMLi) providing conventions used to enable communication between components and optionally other interfaces;
19. an Intelligent Object-to-Intelligent Object query component (OQM) for meta-data definition of data interrelationships on the individual data object level;

20. an Intelligent Object-to-Intelligent Object meta-data query interface (OQMi) providing conventions used to enable communication between components and optionally other interfaces;
21. an iPool-to-iPool query component (PPQ) for meta-data definition of data interrelationships on the iPool level;
22. an iPool-to-iPool meta-data query interface (OQMi) providing conventions used to enable communication between components and optionally other interfaces;
23. an aggregate meta-data index generator component (aMDX), for generating meta-data indices based upon aggregated information and processing results;
24. an aggregate meta-data index generator interface (aMDXi) providing conventions used to enable communication between components and optionally other interfaces;
25. an aggregate real-time significance generator component (aRSG), for comparison; correlation; significance detection; and significance generation of relationships between Intelligent Object data and between iPool subsets;
26. an aggregate real-time significance generator interface (aRSGi) providing conventions used to enable communication between components and optionally other interfaces;
27. a result aggregation engine component (RAE), for aggregation of significant results of queries or analytical processing applied to any content of the Intelligent Object Pool;
28. a result aggregation engine interface (aRAEi) providing conventions used to enable communication between components and optionally other interfaces;
29. an IMO Zoom component (IMO-Z) for interactive user viewing;
30. an IMO Zoom interface (IMO-Zi) providing conventions used to enable communication between components and optionally other interfaces;
31. a distributed learning engine component (DLE), for automated and/or interactive computer learning in a distributed data and applications environment;
32. a distributed learning engine interface (DLEi) providing conventions used to enable communication between components and optionally other interfaces;
33. a knowledge extraction engine component (KEE), for automated and/or interactive knowledge extraction; and
34. a knowledge extraction engine interface (KEEi) providing conventions used to enable communication between components and optionally other interfaces.